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Pesticide Fact Sheet Number 184
Tetrachlorvinphos

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16. Abstract (Limit: 200 words)

This document contains up-to-date chemical information, including a summary of the Agency's regulatory position and rationale, on a specific pesticide or group of pesticides. A Fact Sheet is issued after one of the the following actions has occurred.

1. Issuance or reissuance of a registration standard,
2. Issuance of each special review document,
3. Registration of a significantly changed use pattern,
4. Registration of a new chemical, or
5. An immediate need for information to resolve controversial issues relating to a specific chemical or use pattern.

17. Document Analysis a. Descriptors

Pesticides, regulations, Chemical Information Fact Sheet, Use Patterns, science findings.

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

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Office of Pesticide Programs (TS-766C)
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EPA

Pesticide Fact Sheet

Name of Chemical: Tetrachlorvinphos
Reason for Issuance: Registration Standard
Date Issued: October 14, 1988
Fact Sheet Number: 184

1. DESCRIPTION OF CHEMICAL

Generic Name: (Z)-2-chloro-1-(2,4,5-trichlorophenyl) vinyl dimethyl phosphate

Common Name: Tetrachlorvinphos

Trade and Other Names: Rabon, Stirofos, Gardona, Gardcide

EPA Chemical (Shaughnessy) Codes: 083701

Chemical Abstracts Service (CAS) Number: 22248-79-9 [(Z)-isomer]
22350-76-1 [(E)-isomer]
961-11-5 (mixed isomers)

Year of Initial Registration: 1966

Pesticide Type: Insecticde

Chemical Family: Organophosphate

U.S. and Foreign Producers: E.I. Dupont de Nemours & Co.
Fermenta Animal Health Co.

2. USE PATTERNS AND FORMULATIONS

Application: Control of filth or manure flies associated with livestock and poultry as a feed additive, in mineral blocks; indoor on animal premises, direct animal treatment, garbage dumps.

Types and Methods of Application: Premise treatment by conventional hydraulic sprayer or low pressure knapsack; animal treatment by hand (shaker can, hand duster, grooming brush, dust mitt), pressurized spray, flea collars, ear tags, oral feed additive, dust bags, and oral mineral block

Types of Formulations: Dust, granular, pelleted/tableted, wettable powder, wettable powder/dust, impregnated material, emulsifiable concentrate, ready-to-use and pressurized liquid.

3. SCIENCE FINDINGS

Summary Science Statement

Technical tetrachlorvinphos is not very toxic by the inhalation route of exposure, and does not produce clinical signs of neurotoxicity. No data are available to assess the toxicity of tetrachlorvinphos by the acute oral and dermal routes of exposure and studies are being required in the Standard. Tetrachlorvinphos is not teratogenic in rabbits but the effects in rats have not yet been assessed. Rat teratology data received in response to a Comprehensive Data Call-In (1984) were not received in time to be included in the reviews for this Standard. Available data indicate that the potential effects of tetrachlorvinphos on reproduction are minimal; the only compound-related effect observed in the rat was an increase in liver size in the F3b weanlings in the highest dose tested (HDT). There are no acceptable mutagenicity studies on tetrachlorvinphos. Based on a chronic feeding study in dogs, cholinesterase inhibition and reduced weight gain are the significant toxic effects resulting from chronic exposure to tetrachlorvinphos.

Based on the Agency's Guidelines for Carcinogen Risk Assessment, the Agency has classified tetrachlorvinphos as a Group C (possible human) carcinogen with a cancer potentcy estimate (Q_1^*) of 3.14×10^{-3} $(mg/kg/day)^{-1}$.

Available data indicate that tetrachlorvinphos is practically non-toxic to birds, but is highly toxic to fish and honey bees (contact). Available data are insufficient to characterize the environmental fate of tetrachlorvinphos. Preliminary findings indicate that 14^C tetrachlor vinphos degrades with a half-life of <8 days in medium loam soil.

Chemical Characteristics of the Technical Material

Physical State: solid

Color: tan to brown

Odor: mild chemical

Molecular Weight and Formula: 366.0; $C_{10}H_9Cl_4O_4P$

Boiling Point: N/A solid at room temperature

Vapor Pressure: no data submitted

Density: (bulk density) 50-55 lb/cu ft

Solubility in various solvents: at 0 C: 40 ppm in chloroform,
40 ppm in dichloromethane,
20 ppm in acetone,
8 ppm in xylene,
15 ppm in water at 24 C

Toxicology Characteristics

Acute Oral: No available studies

Acute Dermal: No available studies

Primary Dermal Irritation: No available studies

Primary Eye Irritation: No available studies

Dermal Sensitization: No available studies

Acute Inhalation: 3.61 mg/L Tox. Category III

Major routes of exposure: dermal and inhalation

Delayed neurotoxicity: negative

Subchronic toxicity: normocytic anemia and plasma cholinesterase inhibition

Oncogenicity: Group C carcinogen; (mouse) Sys. NOEL= 240 mg/kg/day

(rat) Sys. NOEL= 6.25 mg/kg/day

Chronic Feeding: (Dog) Sys. NOEL= 3.13 mg/kg/day
Sys. LEL= 50 mg/kg/day

Metabolism: (dog and rat) completely metabolized in both; primarily excreted in urine

Teratogenicity: (Rabbits) Maternal NOEL= 375 mg/kg
Fetotoxic NOEL=150 mg/kg
Teratogenic NOEL= >750 mg/kg

Reproduction: (Rat) NOEL=16.65 mg/kg/day
LEL= 50.0 mg/kg/day

Mutagenicity: No acceptable studies

Physiological and Biochemical Characteristics

Mechanism of Pesticidal Action: Cholinesterase inhibition following ingestion of tetrachlorvinphos

Metabolism and Persistence in Plants and Animals: Currently, there are no end-use products registered for use on any plant commodity. The nature of the residue in animals is not adequately understood. However, the available animal metabolism data indicate that residues of tetrachlorvinphos will occur in the tissues of ruminants and poultry following ingestion of feeds containing tetrachlorvinphos.

Environmental Characteristics

Available data are insufficient to characterize the environmental fate of tetrachlorvinphos.

Ecological Characteristics

Avian acute toxicity: Mallard Duck LD_{50} > 2,000 mg/kg

Avian dietary toxicity: Mallard Duck LD_{50} > 5,000mg/kg

Freshwater fish acute toxicity: Bluegill LC_{50} = 0.53 ppm
Rainbow Trout LC^{5}_{0} = 0.43 ppm

Freshwater invertebrate toxicity: No available studies

Marine invertebrate toxicity: No available studies

4. TOLERANCE ASSESSMENT

Tolerances have been established for residues of tetrachlorvinphos in/on a variety of raw agricultural commodities (40 CFR 180.252). A feed additive regulation has also been established for tetrachlorvinphos (21 CFR 186.950). Since there are no currently registered products bearing labeling for use on food crops tolerance revocation procedures (40CFR 180.7) will be initiated for apples, field corn, sweet corn and popcorn, fresh corn forage and fodder, alfalfa, cherries, cranberries, peaches, pears, and tomatoes. The Agency has evaluated the residue and toxicology data supporting the tolerances on animal commodities and has determined that it does not have sufficient data to support the currently established tolerances residues of tetrachlorvinphos. Because of the extensive residue chemistry and toxicology data gaps, no significant new tolerances or new food uses will be granted until the Agency has received data sufficient to evaluate the dietary exposure of tetrachlorvinphos.

There are no Canadian or Mexican tolerances and no Codex Maximum Residue Limits (MRLs) have been established for tetrachlorvinphos residues in poultry fat and eggs. Therefore, no compatibility questions exist with respect to the Codex MRLs.

5. SUMMARY OF REGULATORY POSITIONS

The Agency is not initiating a special review for tetrachlorvinphos at this time. Although tetrachlorvinphos has been classified as a Group C oncogen (possible human), anticipated dietary exposure to humans and the associated risk is not high (10^{-6}).

The Agency has detemined that based upon currently available data, tetrachlorvinphos does not meet the risk criteria (40 CFR 152.170) for restricted use, and thus, products containing tetrachlorvinphos do not warrant restricted use classification at this time.

The Agency will reevaluate the safety and efficacy data for various formulations of tetrachlorvinphos to domestic animals (dogs,cats,hoses)in order to determine if further regulatory action is warranted.

The Agency is requiring protective clothing for workers or other users who mix, load, and/or apply tetrachlorvinphos.

The Agency is requiring data to show the concentration and degradation products of tetrachlorvinphos in fresh manure at the time it is used on land as fertilizer.

The Agency will not grant any tolerances for significant new food uses[1] until sufficient data (residue chemistry and toxicology) are submitted for the Agency to perform a tolerance reassessment for tetrachlorvinphos.

6. LABELING REQUIREMENTS

All products allowing for outdoor use must bear the following environmental hazards statement:

"This is toxic to fish. Do not contaminate water when disposing of equipment washwaters."

The following protective clothing statements must appear on all products allowing for use on livestock, agricultural premises, feed additives: For sprays and dusts:

"Wear long-sleeved shirt and pants; chemical resistant gloves; shoes and socks." For ear tags: "Wear gloves when applying tags".

The following statements must appear on all products allowing for domestic use:

"Wear long-sleeved shirt and pants, shoes and socks."

All products allowing for use as a feed additive and/or use on manure (droppings) must bear the following statement:

"Do not use manure/droppings on land where food crops are to be grown during the current growing season."

7. SUMMARY OF DATA GAPS

DATA		DUE DATE From DATE OF STANDARD
Product Chemistry-	All	9-15 Months
Environmental Fate-	Hydrolysis	
	Photodegradation (in water)	
	Metabolism Studies	
	Mobility Studies	9-27 Months
	Dissipation Studies (soil)	
	Dissipation Study (excrement)	
Toxicology-	Acute Oral (rat)	
	Acute Dermal (rat)	
	Eye Irritation (rabbit)	9-12 Months
	Dermal Irritation (rabbit)	
	Dermal Sensitization (guinea pig)	
	Mutagenicity	
	21-Day Dermal	
	Oncogenicity (rat)	50 Months
	Teratology (rat)	

Ecological Effects- Acute Toxicity to Freshwater Invertebrates	9 Months
Residue Chemistry- Livestock Metabolism	
Analytical Methods	
Storage Stability	18-24 Months
Magnitude of residues in meat, milk, eggs	

8. CONTACT PERSON AT EPA

George T. LaRocca
Product Manager (15)
Insecticide-Rodenticide Branch
Registration Division (TS-767C)
Office of Pesticide Programs
Environmental Protection Agency
401 M Street, S. W.
Washington, D. C. 20460

Office location and telephone number: Room 204; (703) 557-2400

Crystal Mall #2
1921 Jefferson Davis Highway
Arlington, VA 22202
(703) 557-2600

DISCLAIMER: The information in this Pesticide Fact Sheet is a summary only and is not to be used to satisfy data requirements for pesticide registration and reregistration. The complete Registration Standard for the pesticide may be obtained from the National Technical Information Service. Contact the Product Manager listed above for further information.